

ABSTRACT

Improved temperature stabilization can be obtained for pulsed gas discharge laser systems, such as excimer laser systems, using information about the energy dissipation of the system. Temperature sensors have a limited response time, which can lead to undesirable instability in gas temperature. By determining the heat energy provided to the discharge chamber over sufficiently small periods of time, a system controller can account for rapid variations in the temperature of the laser gas. The temperature regulation controller can adjust a flow of cooling liquid into the discharge chamber to account for these rapid variations on a scale that is much shorter than the response time of the temperature sensors. For variations over longer periods of time, the temperature regulation controller can utilize an active heater in contact with the laser tube to heat the laser tube body, thereby uniformly heating the gas in the tube.